

Integrated Stack and Advanced MEAs for High-Yield, Long-Life Helium Reclamation System, Phase I

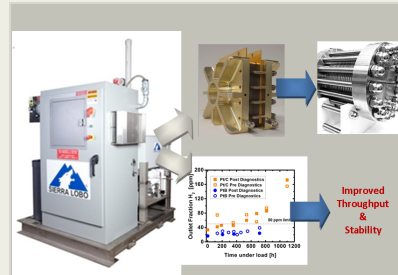
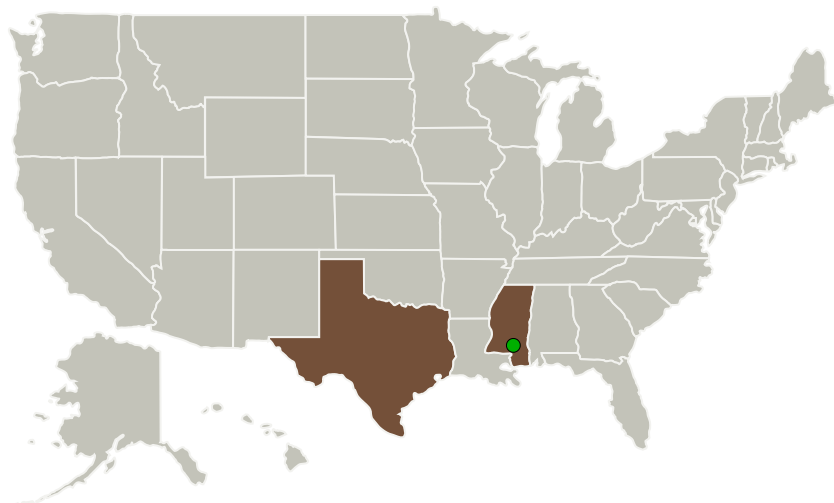
Completed Technology Project (2015 - 2015)



Project Introduction

Gaseous helium reclamation is critical in reducing operating costs at rocket engine test facilities. Increases in cost and potential shortages of helium will dramatically impact testing of rocket engines for launch vehicles and space propulsion systems as the global supply of this non-renewable element diminishes. Sierra Lobo (SLI) has developed an advanced electrochemical Helium Recovery System (HRS), but has identified membrane longevity as a key limitation in the commercialization and deployment of the technology. FuelCellsEtc has teamed with SLI to address these issues. FCE will use their extensive technical expertise in Membrane Electrode Assembly design and manufacturing as well as stack hardware design to address the two primary limitations to the existing HRS technology: Longevity and Throughput. The Phase I effort will identify, test and verify an Advanced MEA based on the particular operating parameters of the HRS. In addition, preliminary stack designs will be initiated which will increase the throughput capability of the HRS by an estimated 10x. These improvements will increase the TRL from 4 to 5 in Phase I and from 5 to 7/8 by the end of Phase II.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
FuelCellsEtc	Lead Organization	Industry	College Station, Texas
● Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations	
Mississippi	Texas

Project Transitions

June 2015: Project Start

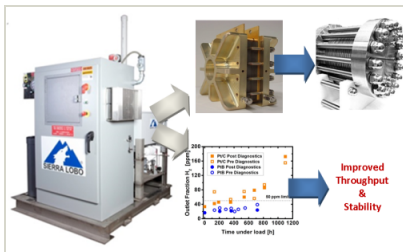
December 2015: Closed out

Closeout Summary: Integrated Stack and Advanced MEAs for High-Yield, Long-Life Helium Reclamation System, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/139132>)

Images



Briefing Chart Image

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(<https://techport.nasa.gov/image/135091>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

FuelCellsEtc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

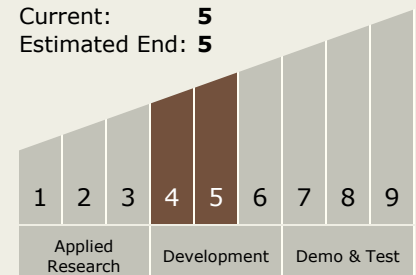
Carlos Torrez

Principal Investigator:

Daniel Westerheim

Technology Maturity (TRL)

Start: 4
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.1 Infrastructure Optimization
 - └ TX13.1.3 Commodity Recovery

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System